



U.S. DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Admin.
NATIONAL OCEAN SERVICE
Damage Assessment Center
Florida Keys National Marine Sanctuary

DATE: 11/15/01

TO: Sharon Shutler and Martin Hindel, NOAA General Counsel
Maureen Malvern and Jerome Johnson, Florida DEP Office of General Counsel

FROM: Kevin Kirsch and Sean Meehan, NOAA Damage Assessment Center, Florida
Keys National Marine Sanctuary

SUBJECT: *Eye One* vessel grounding assessment report

FMP INCIDENT (CASE) #: 01-3A-9911

FMP CITATION: 230083A

NAME & DESCRIPTION OF VESSEL: *Eye One*, 41' Chris-Craft cabin cruiser

VESSEL OPERATOR: James C. Priddy

DATE AND TIME OF INCIDENT: 7/04/01 @ 2230 hrs.

LOCATION OF INJURY: Bethel Bank, near marker #16 (state water, Marathon, FL)

LAT/LONG POSITION: N 024° 43.9461' W 081° 07.6151' (middle of blowhole)
N 024° 43.9495' W 081° 07.6125' (middle of berm)

TOTAL AREA IMPACTED:

28.14 m² of seagrass bottom cover excavated
35.51 m² of seagrass bottom cover buried
63.65 m² of seagrass bottom cover impacted

PHOTO/VIDEO DOCUMENTATION:

Underwater Digital video

DISCUSSION: On 07/05/01 Kevin Kirsch and Sean Meehan conducted an injury assessment of the grounding site of the 41' Chris-Craft power vessel *Eye One* (see Figures 1 & 2). This grounding occurred on the east end of Bethel Bank near marker # 16 (See NOAA Chart # 11449). GPS Lat/Long coordinates were taken at several points within the injury.

METHODOLOGIES

Utilizing differentially corrected, surveying-grade DGPS equipment (Trimble® Pro XR with a TSC1 Datalogger), the grounding site was mapped by physically tracing the outlines of the various injury features. The coordinates generated by the tracing work were downloaded to GPS Pathfinder® Office data processing software version 2.70 (Trimble) and then to Arcview® GIS version 3.2a (ESRI), which is used to arrive at square meter area calculations for the injury features. Depth measurements were made by passing an inflatable 8' boat back and forth over the injury equipped with a Garmin® 185 Depth Sounder integrated with a Trimble® Pro XR DGPS mounted on the stern. Depth readings taken by the Garmin are incorporated with differentially corrected positions taken by the Trimble. This information is then processed using Arcview® GIS version 3.2a with the 3D Analyst Extension resulting in a 3 dimensional view of the area. Measurements were made using the water surface as the level plane.

Community composition, percent cover and density of the benthic community, both in the injured area and in the surrounding undisturbed area, were assessed using a modified Braun-Blanquet technique (Kenworthy and Schwarzhild, 1997; Braun-Blanquet, 1932). This method involves placement of a 0.25m² quadrat on the substrate and visually inspecting the content of the quadrat. The submerged aquatic vegetation (seagrass and macroalgae) and/or coral are identified and assigned a cover-abundance scale value. The scale values are: 0.0 = not present, 0.1=solitary specimen, 0.5=few with small cover, 1=numerous but less than 5% cover, 2=5-25% cover, 3=25-50% cover, 4=50-75% cover, and 5=75-100% cover. In order to determine the percent cover per individual species, as well as the total seagrass cover, the Braun-Blanquet scores by species and total cover are averaged over all of the quadrats assessed within each feature (injured area, undisturbed area). The point estimates of percentage cover corresponding to these average Braun-Blanquet scores are then calculated using the attached conversion table (see Appendix A). The loss of percent cover of seagrass as a result of the grounding can then be assessed by comparing the percent cover of the injured area to that of the undisturbed area immediately adjacent to the injury.

DESCRIPTION OF INJURY

This grounding occurred on a shallow seagrass bank characterized as a mixed seagrass community, consisting of *Syringodium filiforme* (Manatee Grass) and *Thalassia testudinum* (Turtle Grass). Other living components include sponges and various invertebrates typical of seagrass meadows in this area of the FKNMS, various species of macroalgae, and numerous species of fishes. The sediments consist of *Porites spp.* coral rubble, sand and *Halimeda spp.* algal fragments.

The injury consisted of a blowhole, a berm and a bow/keel scar (see Figure 3). The blowhole had a planimetric area of 27.16 m² with a maximum depth of 1.0 meters below the surrounding seafloor (see Figure 4). The volume of material removed is calculated to be 12.65 m³ with a

baseline of 0.6 meter below water level. The bow scar extended from the blowhole for 3.57 meters with an average width of 0.28 meters. Due to overlap of the features, the bow scar and blowhole were merged in Arcview before calculating the area impacted. The material excavated from the blowhole created berm to the north of the blowhole (see Figure 3). This berm covered an area of 35.51 m² of seagrass bottom cover.

The total area impacted is calculated to be 63.65 m² of seagrass bottom cover, mixed *Thalassia testudinum* (Turtle grass) and *Syringodium filiforme* (Manatee Grass).

Using the Braun-Blanquet technique, no species of seagrass were noted within the injury caused by the *Eye One* (see Table 1). In the surrounding undisturbed areas, two species of seagrass were found. This area is mixed *Thalassia testudinum* (Turtle grass) and *Syringodium filiforme* (Manatee Grass) with an average percent cover of 12.5% and 13.75 % , respectively. (see Table 2).

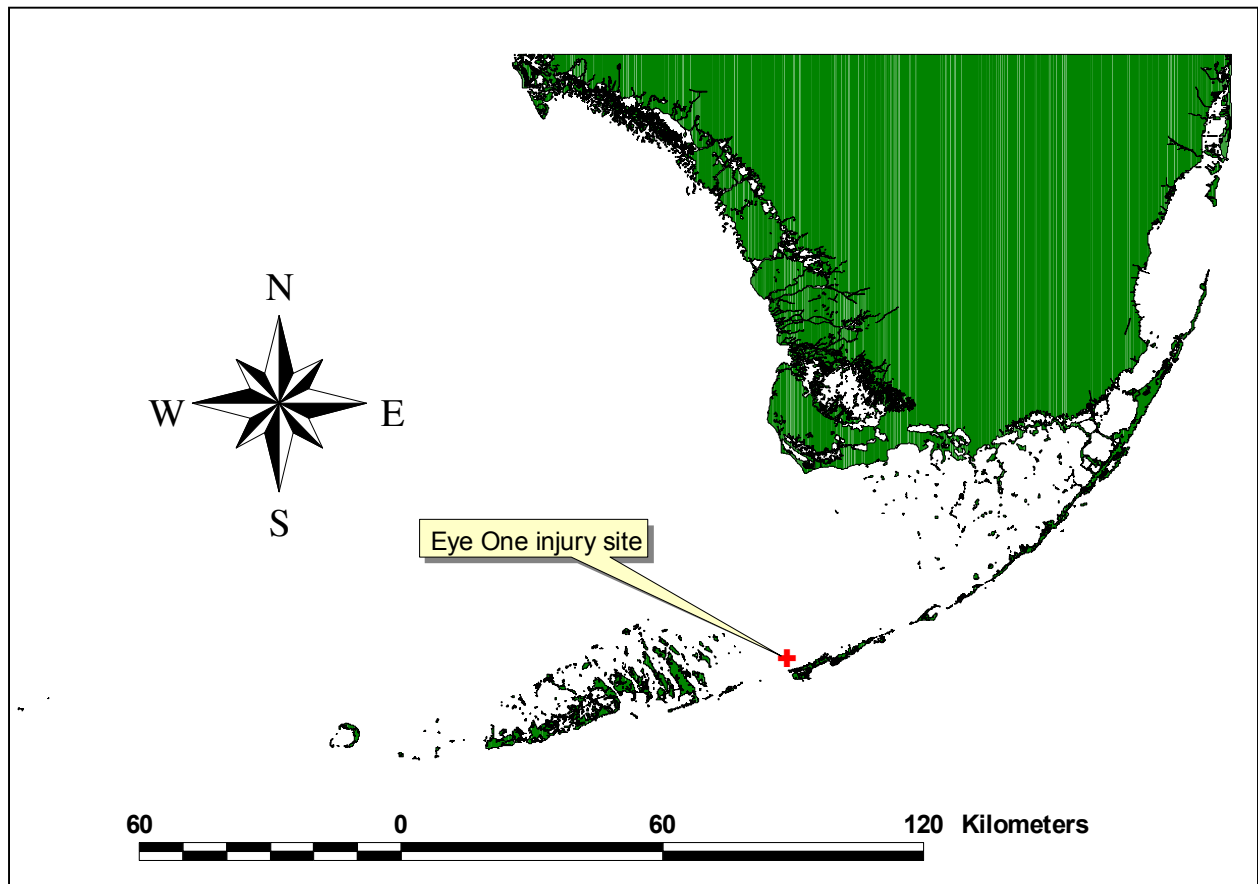


Figure 1. Location of *Eye One* injury site

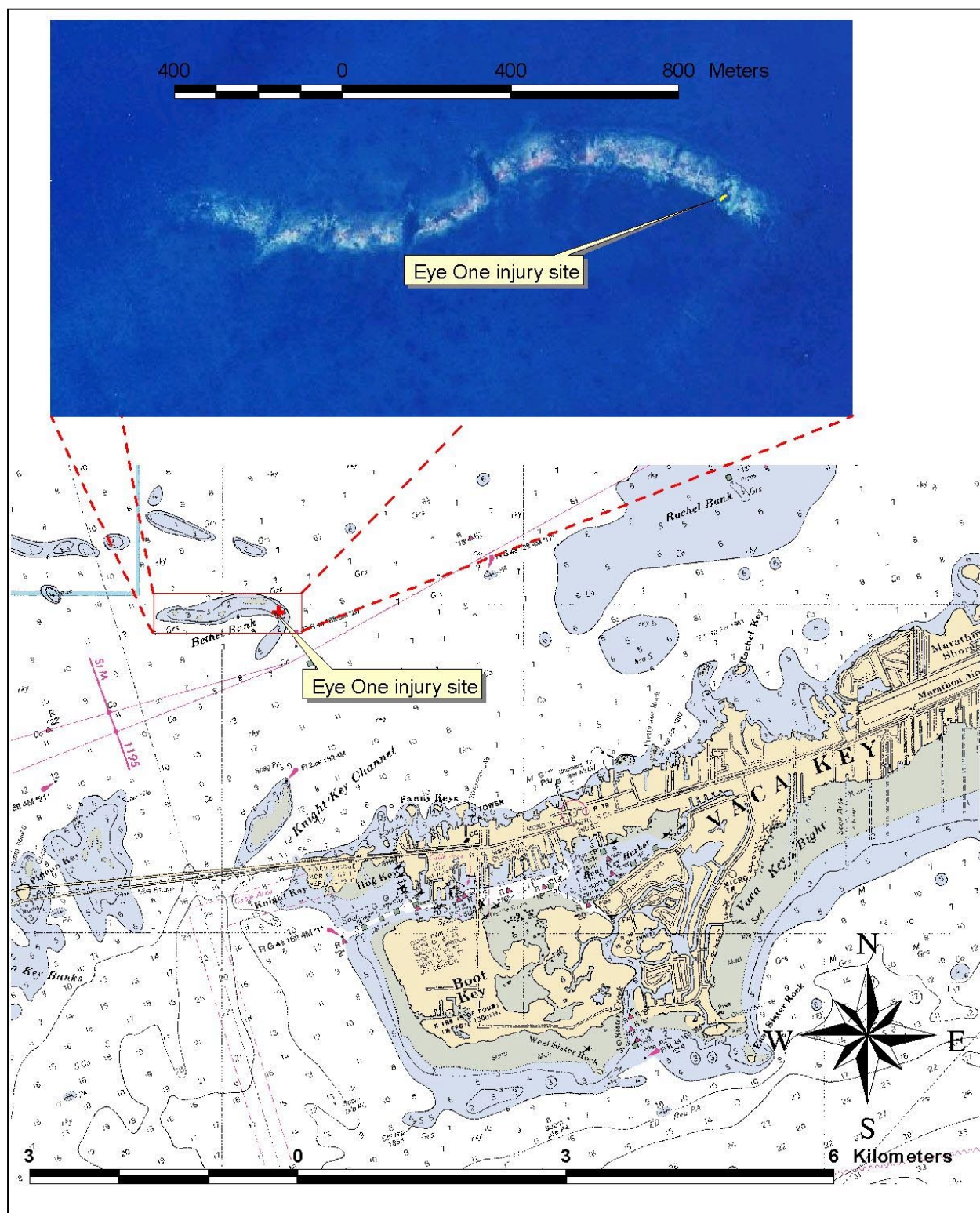


Figure 2. Location of *Eye One* injury site on NOAA Chart #11449 and 1995 Digital Ortho Quarter Quad photo with injury superimposed in yellow (injury is geographically correct and to scale).

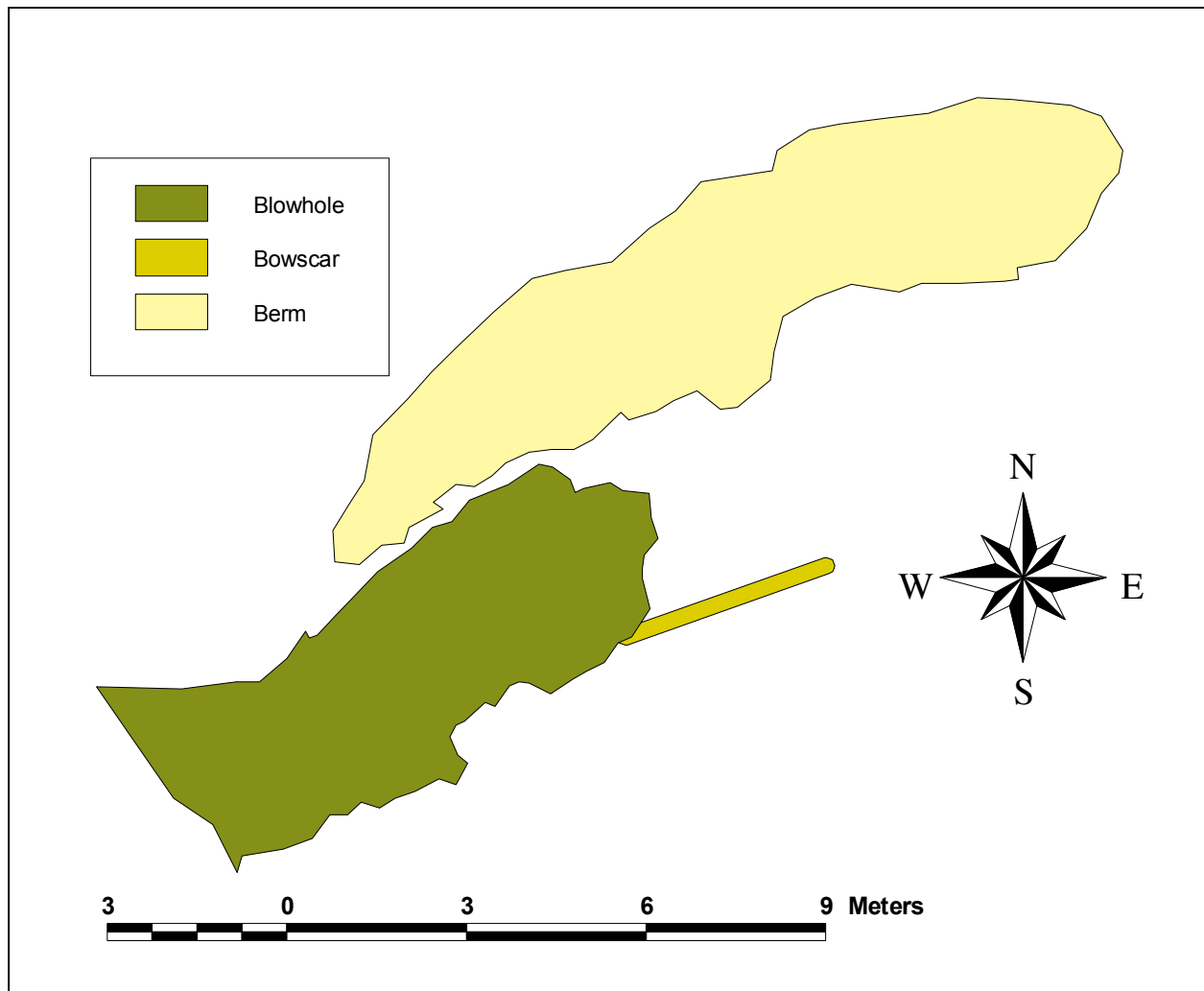


Figure 3. Physical dimensions of the *Eye One* injury.

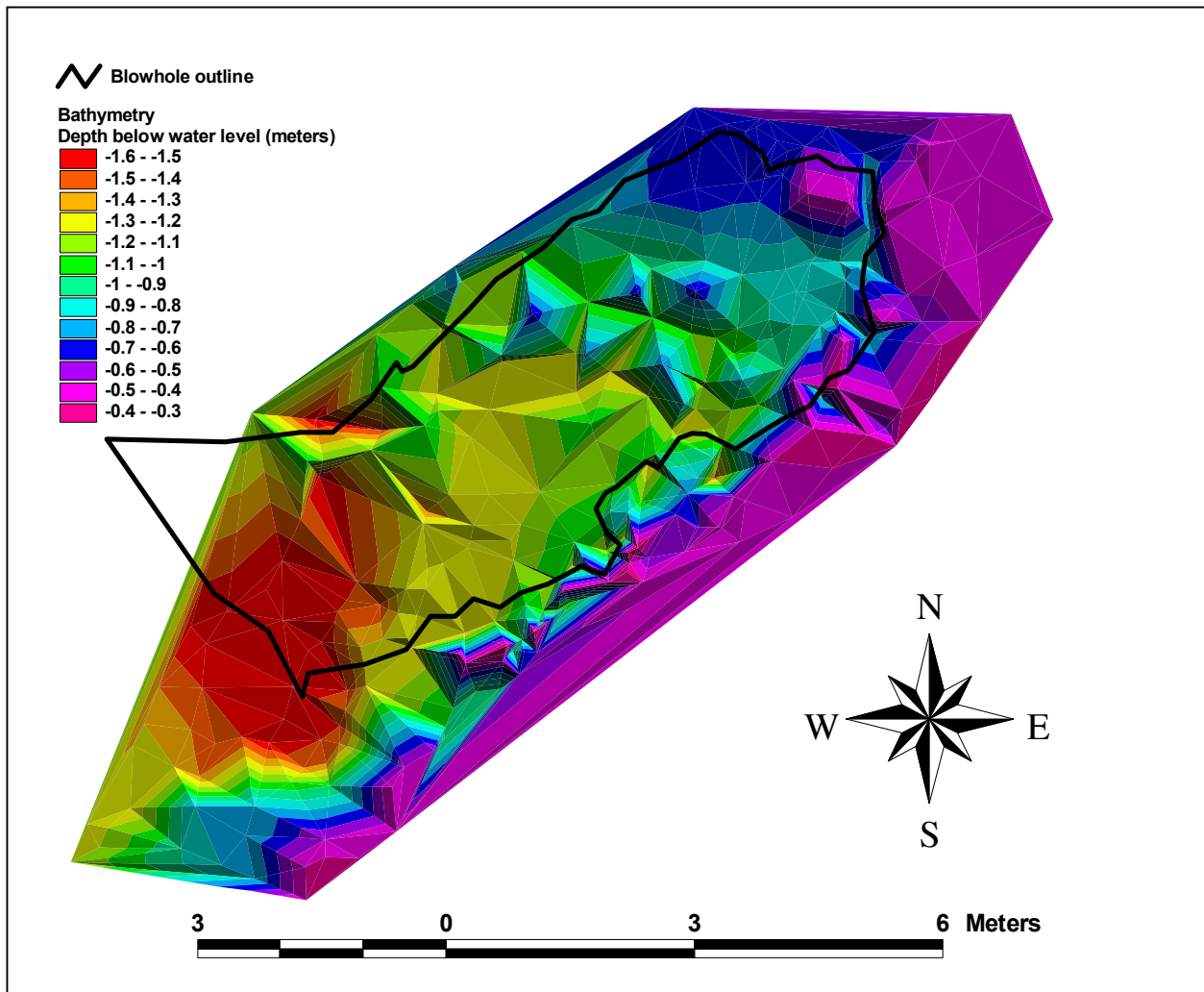


Figure 4. Bathymetry of *Eye One* injury site.

Table 1. Summary of Raw Braun-Blanquet Scores (See Braun- Blanquet scores in Appendix B)

Density ¹	Species	Blow Hole	Berm Scar	Control
	<i>T. testudinum</i>	0	0	1.8
	<i>H. wrightii</i>	0	0	0
	<i>S. filiforme</i>	0	0	1.9

1) Density = $D_i = \text{SUM} (S_{ij}/n)$

D_i = density of species i

j = quadrat number

S_{ij} = BB score for species i in quadrat j

n = total number of quadrats in transect

Table 2. Braun - Blanquet Scores converted into percent cover. (See Conversion Table in Appendix C)

Percent Cover	Species	Inside Injury	Surrounding Habitat
	<i>T. testudinum</i>	0	12.5
	<i>H. wrightii</i>	0	0
	<i>S. filiforme</i>	0	13.75
	Total		26.25

REFERENCES

Braun-Blanquet, J. 1932. *Plant Sociology*- the study of plant communities. G.B Fuller and H.S Conrad, Eds. Koeltz Scientific Books. Koenigstein. West Germany.

Kenworthy W.J. and A. Schwarzhild. 1997. Vertical growth and short shoot demography in *Syringodium filiforme* in outer Florida Bay, USA. Marine Ecology Progress Series. vol 173. pp. 25- 37.

Appendix A: *Eye One*: Braun Blanquet Damage Assessment and Habitat Characterization

Percent Cover and Services Lost

Species	Category	Aboveground Percent of Total Per Species in Control Site	Percent Cover in Control Site	Percent Cover Remaining in Trench Scar	Percent of Services Lost in Trench Scar	Percent Cover Remaining in Berm Scar	Percent of Services Lost in Berm Scar
<i>T. testudinum</i>	Density	47.62%	12.50%	0.00%	12.50%	0.00%	12.50%
<i>H. wrightii</i>	Density	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
<i>S. filiforme</i>	Density	52.38%	13.75%	0.00%	13.75%	0.00%	13.75%
Total		100.00%	26.25%				

Average Braun Blanquet Scores

Species	Category	Blow Hole	Berm Scar	Control
<i>T. testudinum</i>	Density	0	0	1.8
<i>H. wrightii</i>	Density	0	0	0
<i>S. filiforme</i>	Density	0	0	1.9

Prepared by: **NOAA Damage Assessment Center, Marathon, FL**

Appendix B: *Eye One* - Blanquet Scores

Braun Blanquet Damage Assessment

Quad #	Injury	<i>T.t.</i>	<i>S.f.</i>	<i>H.w.</i>	Total Grass	TMA	IB/OB	Sed. Type	Coral
1	C	2	2	0	2	1	IB	CR/S/HH	0
2	C	2	2	0	2	0.5	IB	CR/S/HH	1
3	C	2	2	0	3	1	IB	CR/S/HH	0
4	C	2	2	0	2	2	IB	S/CR/HH	0
5	C	2	2	0	2	2	IB	S/CR/HH	2
6	C	1	2	0	2	2	IB	S/HH/CR	0
7	C	2	2	0	2	1	IB	S/HH/CR	0
8	C	2	1	0	2	2	IB	S/HH/CR	0
9	C	2	2	0	2	2	IB	S/HH/CR	0
10	C	1	2	0	2	2	IB	S/HH/CR	0
Average		1.8	1.9	0	2.1	1.6			0.3
11	BH	0	0	0	0	0	IB	S/CR	0
12	BH	0	0	0	0	0	IB	S/CR	0
13	BH	0	0	0	0	0	IB	S/M/CR	0
14	BH	0	0	0	0	0	IB	S/CR	0
15	BH	0	0	0	0	0	IB	CR	0
Average		0	0	0	0	0			0
16	BM	0	0	0	0	0	IB	CR	0
17	BM	0	0	0	0	0	IB	CR/S	0
18	BM	0	0	0	0	0	IB	S/CR	0
19	BM	0	0	0	0	0	IB	CR/S	0
20	BM	0	0	0	0	0	IB	CR/S	0
Average		0	0	0	0	0			0

KEY TO ABBREVIATIONS

Species:

T.t. = *Thalassia testudinum*

S.f. = *Syringodium filiforme*

H.w. = *Halodule wrightii*

TMA = Total Macroalgae

Sediment Types:

LC = Live Coral

MS = Muddy Sand

SM = Sandy Mud

R = Rock

Injury Regions:

M= Mud

CS = Coarse Shell

HH = Halimeda Hash

CR = Coral Rubble

TR = Trench

BH = Blow Hole

BM = Berm

C = Control (Reference)

Appendix C: Braun-Blanquet Score to Percent Cover Conversion Tables

Interpolation of the Mid-Point of BB Scores			
BB Score	% Cover	BB Score	% Cover
0.00	0.00%	2.60	28.50%
0.10	1.00%	2.70	30.75%
0.20	1.00%	2.80	33.00%
0.30	1.00%	2.90	35.25%
0.40	1.00%	3.00	37.50%
0.50	1.00%	3.10	40.00%
0.60	1.00%	3.20	42.50%
0.70	1.00%	3.30	45.00%
0.80	1.00%	3.40	47.50%
0.90	1.00%	3.50	50.00%
1.00	2.50%	3.60	52.50%
1.10	3.75%	3.70	55.00%
1.20	5.00%	3.80	57.50%
1.30	6.25%	3.90	60.00%
1.40	7.50%	4.00	62.50%
1.50	8.75%	4.10	65.00%
1.60	10.00%	4.20	67.50%
1.70	11.25%	4.30	70.00%
1.80	12.50%	4.40	72.50%
1.90	13.75%	4.50	75.00%
2.00	15.00%	4.60	77.50%
2.10	17.25%	4.70	80.00%
2.20	19.50%	4.80	82.50%
2.30	21.75%	4.90	85.00%
2.40	24.00%	5.00	87.50%
2.50	26.25%		

BB Score	Mid-Point Range
<1= <1%	<1= 1%
1=1%-5%	1=2.5%
2= 5%-25%	2=15%
3= 25%-50%	3=37.5%
4= 50%-75%	4=62.5%
5= 75%-100%	5=87.5%